

Claims

- 1 *Sub* 1. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:
- 3 (a) producing a transgenic plant cell comprising a recombinant protein
4 kinase (PK) domain-containing gene integrated into the genome of said transgenic
5 plant cell and positioned for expression in said transgenic plant cell, said PK
6 domain-containing gene being capable of increasing the level of tolerance to an
7 environmental stress; and
- 8 (b) growing a transgenic plant from said plant cell, wherein said PK
9 domain-containing gene is expressed in said transgenic plant.
- 1 2. The method of claim 1, wherein said environmental stress is
2 dehydration.
- 1 3. The method of claim 1, wherein said environmental stress is excess
2 salinity.
- 1 4. The method of claim 1, wherein said environmental stress is a
2 temperature stress.
- 1 5. The method of claim 1, wherein said plant is protected against
2 multiple stress conditions.

1 ^{Sub} 6. The method of claim 1, wherein the expression of said PK domain-
2 containing gene activates the expression of a stress-protective protein.

1 7. The method of claim 1, wherein said PK domain-containing gene is
2 constitutively expressed in said transgenic plant.

1 8. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:

(a) producing a transgenic plant cell comprising a recombinant calcium-dependent protein (CDPK) gene integrated into the genome of said transgenic plant cell and positioned for expression in said transgenic plant cell, said CDPK gene being capable of increasing the level of tolerance to an environmental stress; and

8 (b) growing a transgenic plant from said plant cell, wherein said CDPK
9 gene is expressed in said transgenic plant.

1 9. The method of claim 8, wherein said environmental stress is
2 dehydration.

1 10. The method of claim 8, wherein said environmental stress is
2 excess salinity.

1 11. The method of claim 8, wherein said environmental stress is a
2 temperature stress.

1 12. The method of claim 8, wherein said plant is protected against
2 multiple stress conditions.

1 13. The method of claim 8, wherein the expression of said CDPK
2 gene activates the expression of a stress-protective protein.

1 14. The method of claim 8, wherein said CDPK gene is constitutively
2 expressed in said transgenic plant.

1 15. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:

3 (a) producing a transgenic plant cell comprising a recombinant CaM-K
4 gene integrated into the genome of said transgenic plant cell and positioned for
5 expression in said transgenic plant cell, said calcium/calmodulin-dependent protein
6 kinase (CaM-K) gene being capable of increasing the level of tolerance to an
7 environmental stress; and

8 (b) growing a transgenic plant from said plant cell, wherein said CaM-K
9 gene is expressed in said transgenic plant.

1 16. The method of claim 15, wherein said CaM-K gene comprises a
2 mammalian CaM-K gene.

1 17. The method of claim 15, wherein said environmental stress is
2 dehydration.

1 18. The method of claim 15, wherein said environmental stress is
2 excess salinity.

1 19. The method of claim 15, wherein said environmental stress is a
2 temperature stress.

1 20. The method of claim 15, wherein said plant is protected against
2 multiple stress conditions.

1 21. The method of claim 15, wherein the expression of said CaM-K
2 gene activates the expression of a stress-protective protein.

1 22. The method of claim 15, wherein said CaM-K gene is
2 constitutively expressed in said transgenic plant.

1 23. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:

3 (a) producing a transgenic plant cell comprising a combination of at
4 least two genes selected from the group consisting of a recombinant PK domain
5 gene, a recombinant CDPK gene, and a CaM-K gene, each of said genes being
6 capable of increasing the level of tolerance to an environmental stress, each of said
7 genes being integrated into the genome of said transgenic plant cell and positioned
8 for expression in said transgenic plant cell; and

9 (b) growing a transgenic plant from said plant cell, wherein a
10 combination of at least two of said genes is expressed in said transgenic plant.

1 *Sub*
2 *13* 24. A transgenic plant comprising a recombinant PK domain gene
3 integrated into the genome of the transgenic plant and positioned for expression in
4 the plant, wherein said PK domain gene is capable of increasing the level of
tolerance, on a plant expressing said PK domain gene, to an environmental stress.

1 25. A seed from a transgenic plant of claim 24.

1 26. A cell from a transgenic plant of claim 24.

1 27. A transgenic plant comprising a recombinant CDPK gene
2 integrated into the genome of the transgenic plant and positioned for expression in
3 the plant, wherein said CDPK gene is capable of increasing the level of tolerance,
4 on a plant expressing said CDPK gene, to an environmental stress.

1 28. A seed from a transgenic plant of claim 27.

1 29. A cell from a transgenic plant of claim 27.

1 30. A transgenic plant comprising a recombinant CaM-K gene
2 integrated into the genome of the transgenic plant and positioned for expression in
3 the plant, wherein said CaM-K gene is capable of increasing the level of tolerance,
4 on a plant expressing said CaM-K gene, to an environmental stress.

1 31. A seed from a transgenic plant of claim 30.

1 32. A cell from a transgenic plant of claim 31.

33. A transgenic plant comprising a recombinant CDPK gene, PK domain gene, CaM-K gene, or any combination thereof integrated into the genome of the transgenic plant cell and positioned for expression in said plant cell, the CDPK, PK domain, and CaM-K genes being capable of increasing the level of tolerance to an environmental stress, wherein said DNA is expressed in said transgenic plant.

1 34. A seed from a transgenic plant of claim 34.

1 35. A cell from a transgenic plant of claim 34.

1 ~~24~~ 36. Substantially pure DNA encoding a PK domain polypeptide, said
2 polypeptide being capable of increasing the level of tolerance to an environmental
3 stress in a transgenic plant.

1 37. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to dehydration.

1 38. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to salinity.

1 39. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to a temperature stress.

1 48. The polypeptide of claim 47, wherein said polypeptide comprises
2 an amino acid sequence substantially identical to the amino acid sequence shown
3 in Fig. 5 (SEQ ID NO: 2).

ADD 4

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